Listing of Claims

1. (Original) A touch pad assembly, comprising:

a touch pad having one or more sensors that map the touch pad plane into native sensor coordinates; and

a controller that divides the surface of the touch pad into logical device units, receives the native values of the native sensor coordinates from the sensors, adjusts the native values of the native sensor coordinates into a new value associated with the logical device units and reports the new value of the logical device units to a host device, the logical device units representing areas of the touch pad that can be actuated by a user.

2. (Original) The touch pad assembly as recited in claim 1 wherein the controller passes the native values of the native sensor coordinates through a filtering process before adjusting the native values into a new value.

3. (Original) The touch pad assembly as recited in claim 2 wherein the filtering process includes determining if the native values are based on noise events or actual events.

4. (Original) The touch pad assembly as recited in claim 3 wherein the controller filters out the noise events and allows the actual events to pass through.

5. (Original) The touch pad assembly as recited in claim 1 wherein the controller further determines if a significant change has been made between the current and last received native values, and only reports the new value when a significant change has been made between the current and last received native values.

6. (Original) The touch pad assembly as recited in claim 1 wherein the native sensor coordinates are Cartesian coordinates.

7. (Original) The touch pad assembly as recited in claim 1 wherein the native sensor coordinates are Polar coordinates.

8. (Original) The touch pad assembly as recited in claim 1 wherein the logical device units are Cartesian coordinates.

9. (Original) The touch pad assembly as recited in claim 1 wherein the logical device units are Polar coordinates.

10. (Original) The touch pad assembly as recited in claim 1 wherein the new value of the logical device units are reported in an absolute mode.

11. (Original) The touch pad assembly as recited in claim 1 wherein the new value of the logical device units are reported in a relative mode.

12. (Original) The touch pad assembly as recited in claim 1 wherein the new value of the logical device units are reported in a Cartesian absolute mode, a Cartesian relative mode, a Polar absolute mode or a Polar relative mode.

13. (Original) The touch pad assembly as recited in claim 1 wherein the new value of the logical device units implements a specific control function in the host device.

14. (Original) The touch pad assembly as recited in claim 1 wherein the logical device units are angular Polar units distributed around the surface of the touch pad in a clock like manner.

15. (Original) The touch pad assembly as recited in claim 1 wherein the ratio of native sensor coordinates to logical device units is between about 1024:1 to about 8:1.

16. (Original) The touch pad assembly as recited in claim 1 further comprising one or more touch buttons having one or more sensors, and wherein the controller receives a native value from the sensors, determines a button status from the native value, and reports the button status to a host device, the button status being used by the host device to implement a button function in the host device.

17. (Original) The touch pad assembly as recited in claim 16 wherein the controller only reports the button status to the host device when it is determined that there is a change in button status.

18. (Original) The touch pad assembly as recited in claim 1 wherein each of the logical device units represent a different movement direction on a display screen of the host device so as to enable joystick implementations, multiple dimensional menu selection or photo image panning.

19. (Original) The touch pad assembly as recited in claim 1 wherein the host device is a media player for storing and playing media such as audio, video or images, the media player including a housing that supports the touch pad assembly, a display for displaying text and graphics to a user of the media player and a CPU capable of receiving the new value of the logical device units from the controller and issuing commands based on the new value of logical device units to other components of the media player, the commands being used to at least move an object on the display.

20. (Original) A method for a touch pad, comprising:

mapping the touch pad into native sensor coordinates;

producing native values of the native sensor coordinates when events occur on the touch pad;

filtering the native values of the native sensor coordinates based on the type of events that occur on the touch pad;

generating a control signal based on the native values of the native sensor coordinates when a desired event occurs on the touch pad.

21. (Original) The method as recited in claim 20 wherein the control signal includes the native values of the native sensor coordinates.

22. (Original) The method as recited in claim 20 further comprising:

adjusting the native values of the native sensor coordinates into a new value when a desired event occurs on the touch pad, the control signal including the new value.

23. (Original) The method as recited in claim 20 wherein the new value has the same units as the native values.

24. (Original) The method as recited in claim 20 wherein the new value has different units as the native values.

25. (Original) The method as recited in claim 20 wherein the step of filtering comprises:
determining if the native values are caused by noise events or actual events; and
filtering out noise events and passing actual events.

26. (Original) The method as recited in claim 25 wherein the step of determining comprises:
comparing a current set of native values with a last set of native values;
classifying the current set of native values as noise events when the current set of native values is substantially similar to the previous set of native values; and
classifying the current set of native values as actual events when the current set of native values is significantly different than the previous set of native values.

27. (Original) The method as recited in claim 25 wherein the control signal includes native values of the native sensor coordinates if it is determined that the events are actual events.

28. (Original) The method as recited in claim 25 further comprising:
adjusting the native values of the native sensor coordinates into a new value if it is determined that the events are actual events, and including the new value in the control signal.

29. (Original) A signal processing method for a controller of a touch pad, comprising:
receiving a current user location;
determining the difference in user location by comparing the current user location to a last user location;
only outputting the current user location when the difference in user location is larger than a threshold value;
converting the outputted current user location into a logical device unit; and
generating a message for a host device, the message including the more logical user location, the more logical user location being used by the host device to move a control object in a specified manner.

30. (Original) The method as recited in claim 29 wherein the threshold value is defined as the number of sensor levels that need to change in the touch pad in order to report a change in the user location.

31. (Original) The method as recited in claim 30 wherein the threshold is determined by the following equation:

Threshold(T) = C*(native sensor resolution of the touch pad/logical device resolution of the touch pad),

where the native sensor resolution defines the maximum number of different user locations that the sensors of the touch pad are able to detect over the touch pad plane, the logical device resolution defines the number of logical device units that the touch pad reports to the host device, and C defines the width border area between clusters of sensors of the touch pad that define one logical device unit.

32. (Original) The method as recited in claim 31 wherein the coefficient C is a value between about 0 and 0.5.

33. (Original) The method as recited in claim 31 wherein the native sensor resolution is about 1024 and the logical device resolution is about 128.

34. (Original) The method as recited in claim 29 further comprising:

storing the current user location for subsequent processing, the current user location acting as the last user location in subsequent processing.

35. (Original) In a computer system that facilitates bi-directional communications between a touch pad assembly and a host device, a message from the touch pad assembly to the host device, the message comprising:

an event field identifying whether the message is a touch pad event or a button event;

an event identifier field identifying at least one event parameter, each event parameter having an event value, the event value for a touch pad event parameter indicating an absolute position, the event value for a button event parameter indicating button status.

36. (Currently Amended) A touch pad assembly capable of transforming a user action into motion onto a display screen, the touch pad system including a touch pad ~~having~~ whose entire touch sensing surface is divided into a plurality of independent and spatially distinct ~~button~~ actuation zones, each of which includes a plurality of sensing nodes of the touch sensing surface.

and each of which represents a different control function ~~movement direction on the display screen so as to enable joystick implementations, multiple dimensional menu selection or photo image panning~~.

37. (New) The touch pad assembly as recited in claim 36 wherein each of the actuation zones are button zones that represent different movement direction on the display screen so as to enable joystick implementations, multiple dimensional menu selection or photo image panning.

38. (New) The touch pad assembly as recited in claim 36 wherein the actuation zones are substantially the same size and shape and include substantially the same number of sensing nodes of the touch sensing surface.

39. (New) The touch pad assembly as recited in claim 36 wherein the touch sensing surface is circular, wherein the touch sensing nodes of the touch sensing surface are positioned at least angularly around the circular touch sensing surface, and wherein the actuation zones are positioned at least angularly around the circular touch sensing surface.